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Effect Of Noise over MRI Segmentation Techniques

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Abstract: this approach is basically used to compare the extracted patterns of internal body tissues which were affected by various noises during acquisition. Segmentation is a computational intelligence discipline which has emerged as a valuable tool for disease analysis, new knowledge discovery and autonomous decision making. The raw, unlabeled data from the MRI image can be clustered first and after that segmentation can be applied in order to obtain the pattern or outlook of a particular organ or tissue so that diagnosticians can use them for diagnosing and finally analyzing the tissues. There are various algorithms which are used to solve this problem. In this paper two important segmentation algorithms are compared. These algorithms are applied to the MRI image of thoracic cavity and performance is evaluated on the basis of the efficiency they provide when they are affected by various types of noises.

Keywords: Clustering, C Means, Fuzzy, Image Noises, K Means, MRI, Segmentation.

I. INTRODUCTION

Image segmentation is one of the most important steps leading to the analysis of image data. The goal is dividing the image into parts that have homogeneous attributes, and have a strong correlation with objects or areas of the real world contained in the image, for general physical images. Image segmentation is an important technology for image processing. There are many applications whether on synthesis of the objects or computer graphic images require precise segmentation. MRI segmentation has been proposed for a number of clinical Investigations of varying complexity. In the clinical context, medical image processing is generally equated to radiology or "clinical imaging" and the medical practitioner responsible for interpreting (and sometimes acquiring) the image is a radiologist. Diagnostic radiography designates the technical aspects of medical imaging and in particular the acquisition of medical images. The radiographer is usually responsible for acquiring medical images of diagnostic quality, although some radiological interventions are performed by radiologists. Nowadays, medical image processing is among the most popular programs and there is no doubt that diagnosticians need them in the enhanced form so as to achieve the higher understanding of the internal tissues. Therefore, demand for image segmentation of medical images is very high. In the field of software data analysis is considered as a very useful and important tool as the task of processing large volume of data is rather tough and it has accelerated the interest of application of such analysis. To be precise segmentation is the analysis of datasets or images that are observational, aiming at finding out unsuspected relationships among datasets and summarizing the data in such a noble fashion that are both understandable and useful to the data users, the diagnosticians [1].Segmentation is a process of partitioning an image space into some non-overlapping meaningful homogeneous regions. In general, these regions will have a strong correlation with the objects in the image. The success of an image analysis system depends on the quality of segmentation. In the analysis of medical images for computeraided diagnosis and therapy, segmentation is often required as a preliminary processing task. Medical image segmentation is a complex and challenging task due to the intrinsically imprecise nature. We used a basic idea to achieve the image segmentation of the thoracic cavity, introduce different types of noises and then analyze which of the two techniques provide better segmentation in spite of noise[2]. In this paper we analyzed, K-Means and Fuzzy C-Means clustering algorithms and affect on them under different types of noise: Gaussian noise, Poisson's noise and speckle noise.we are using the standard database of thoracic cavity and then segmenting the images using fuzzy c means and k means algorithm, introducing noises of various types and then analyzing the results to see which algorithm is segmenting nicely inspite of the noises present.

11. MRI SEGMENTATION ALGORITHMS

In this paper two basic algorithms used are: Fuzzy C- Means Segmentation algorithm and K Means algorithm.

A). K-MEANS ALGORITHM

K-Means is one of the unsupervised learning algorithms for clusters. Clustering refers to the process of grouping pixels of an image such that pixels which are in the same group (cluster) are similar among them and are dissimilar to the pixels